





**Massachusetts Bay
Transportation Authority**

Green Line Type 9 Project Update

March 27, 2017



Overview Type 9 Vehicle Procurement

- **24 Vehicles are required to increase our fleet size to maintain current green line headways when the green line extension is completed.**
 - **Notice to Proceed was provided on September 4, 2014 for formal contract 676 to CAF USA Inc. for the design, testing and delivery of 24 Low Floor Light Rail Vehicles for use on the green line.**
 - **The Type 9 is a multi-level, double articulated vehicle with three trucks, two powered and one low-floor center truck with independent wheels that must operate in the subway and on the street with commercial and passenger automotive vehicles.**
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Project Status Snap Shot

- **2 Pilot Cars shells Complete, Car 3 and 4 in Production**
- **Qualification Testing and Inspection of the Systems Underway**
- **Vehicle Testing will Begin in October 2017 at CAF's Elmira, NY Facility**
- **On Schedule for all cars complete by end of 2018**
- **Continuous Internal and External Stakeholder Involvement Including Supportive State and Federal Oversight**
- **MBTA Senior Executives visited the CAF Elmira, NY Facility on March 22, 2017**





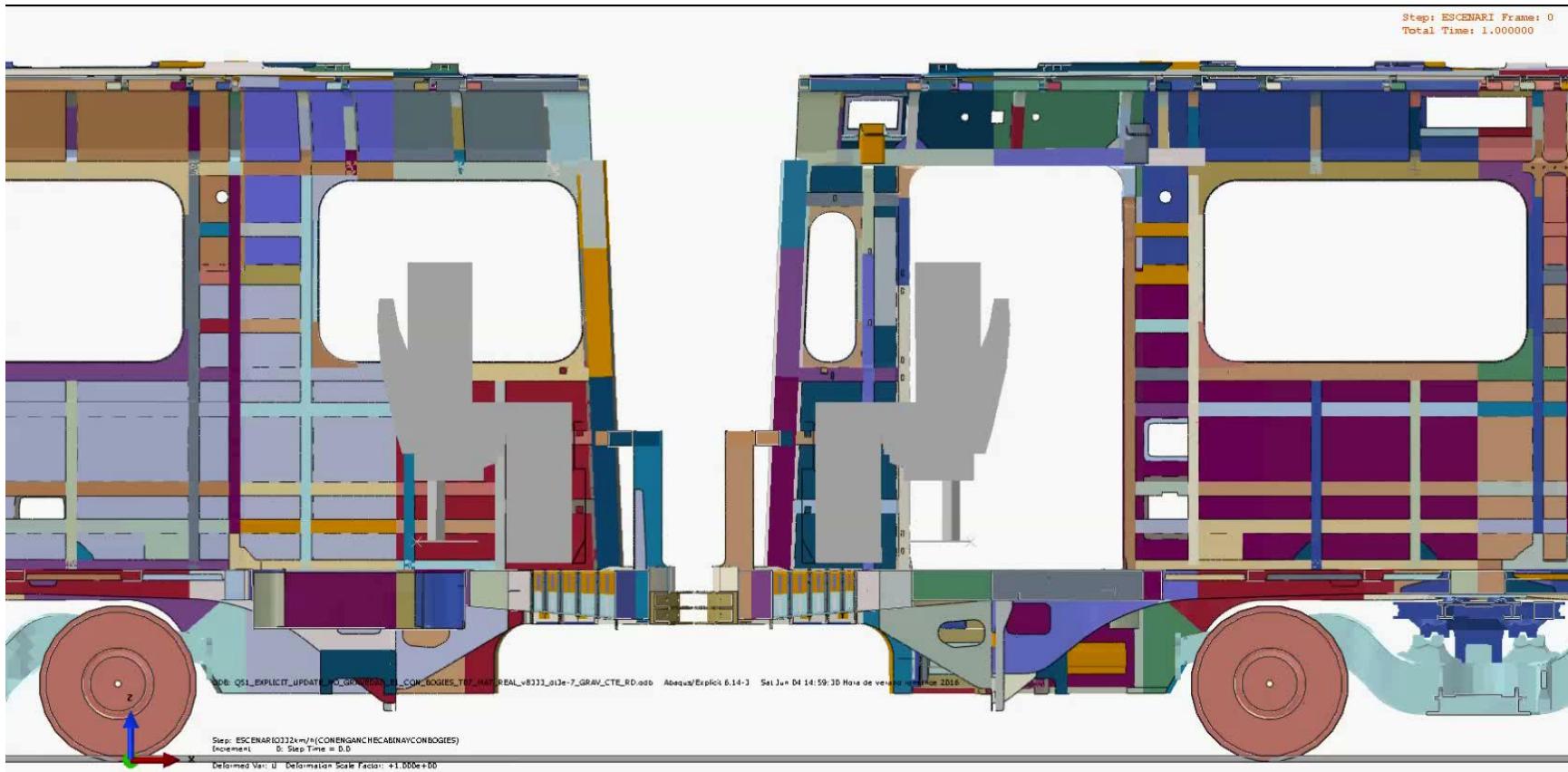
Major Design Milestones Completed

- Car Structural Design and Testing Successfully - Completed
 - Truck Design with Double Disc Brakes - Completed
 - 40% Thicker Wheels Integrated into Trucks – Completed
 - Real World Vehicle Dynamic Modeling - Completed
 - Optimized Interior Design - Completed
 - New Internally Fitted Hydraulic Control Units – Completed
 - New Dual APS Design Integration - Completed
 - New Sliding Plug Doors Integrated for all Entrances
 - New Robust and Internally Mounted Bridgeplate Integrated
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Crash Energy Management (CEM) Structural Design

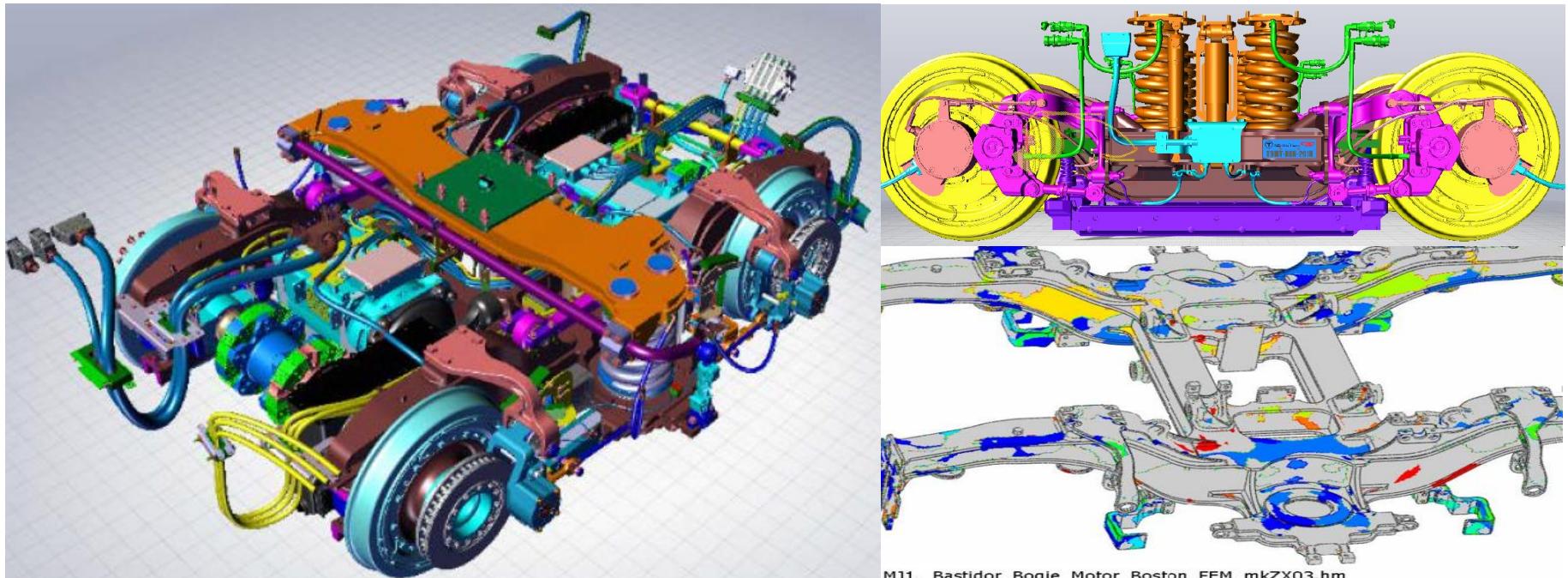
- Nations first CEM Light Rail Vehicle Designed to New Standards and Compatible with the Existing Fleet and Forward Compatible with Future Fleets





Advanced Truck Design – Reliability and Maintainability Improved

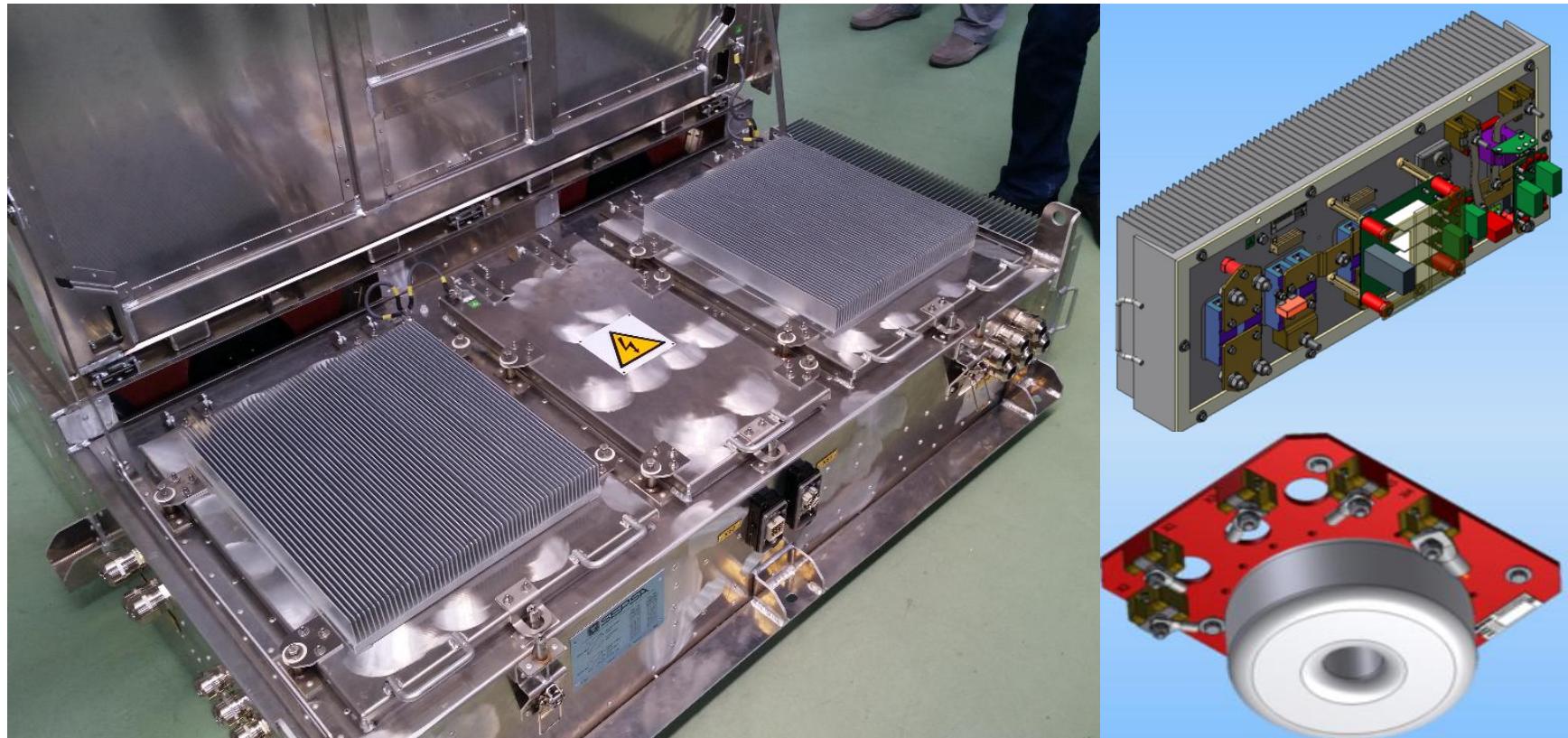
- Extensive Modeling In Real World Conditions for Better Designed Performance
- Better Braking Capacity and Hardware for Reduce Maintenance and Increased Reliability
- Thicker Wheels for a Significant Reduction in Maintenance





Dual Auxiliary Power System – Reliability Improvement

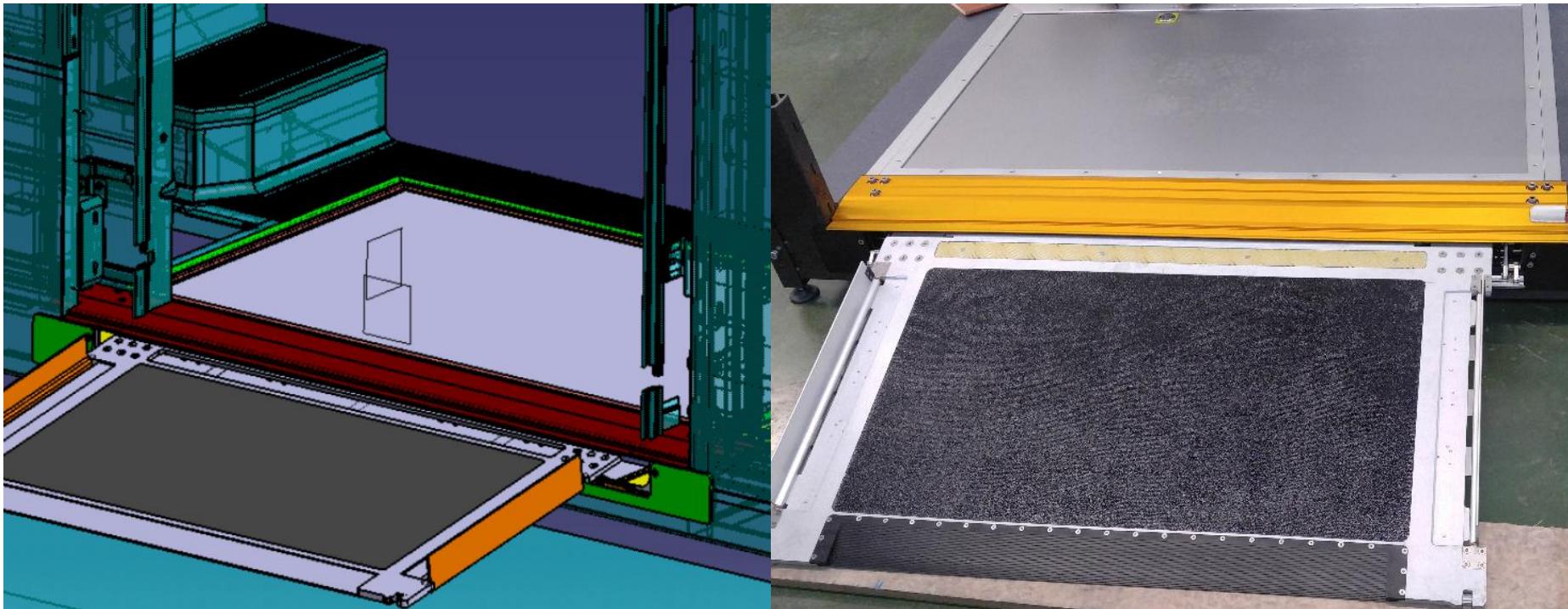
Increased Capacity and New Redundancy for Increased Passenger Service Reliability





Improved Bridgeplate Design – Reliability Improvement

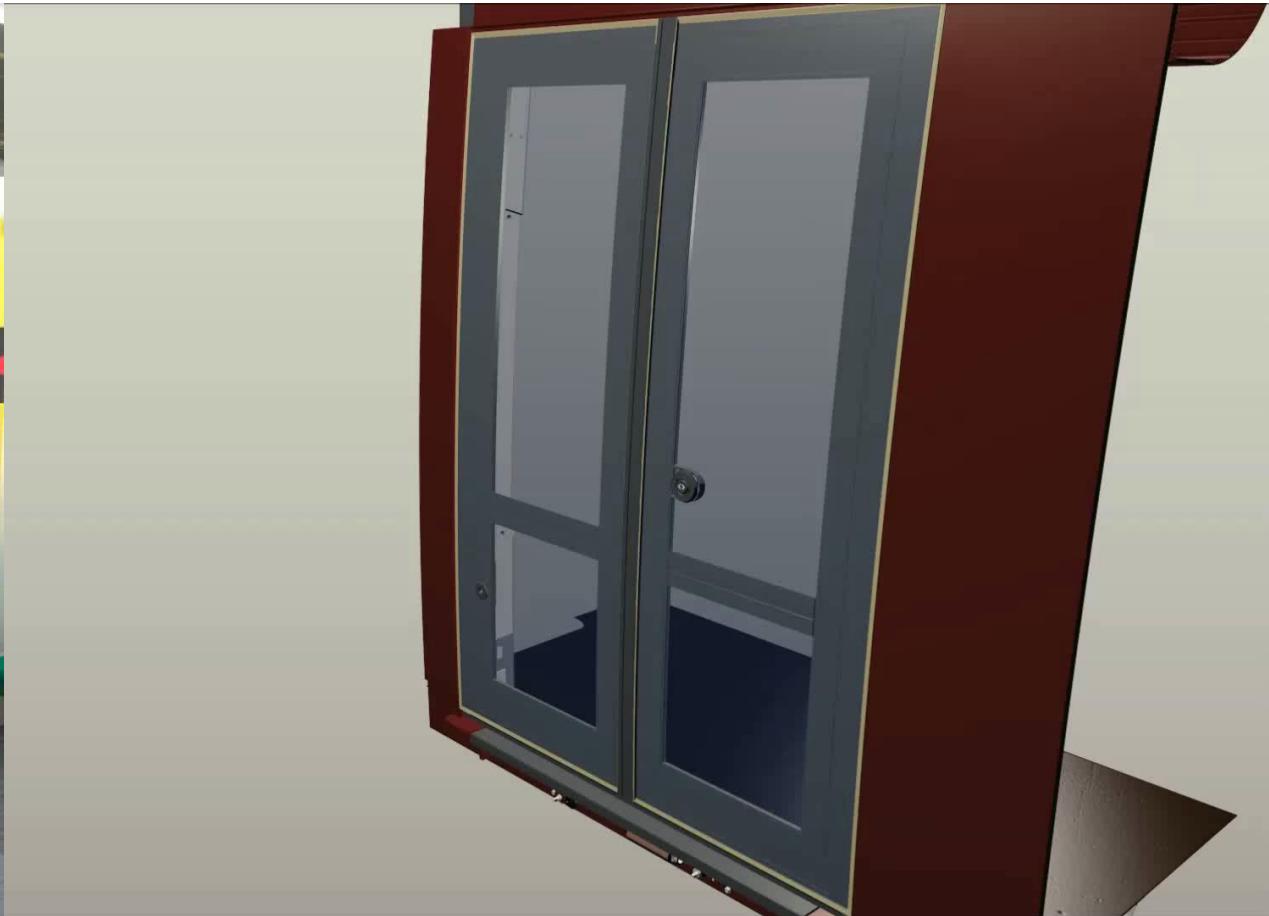
- **Installed Internally for Ease of Access and Protection from the Elements**
 - Advanced mechanical components selected for improved passenger service reliability





Integrated Sliding Plug Doors – Service Improvement

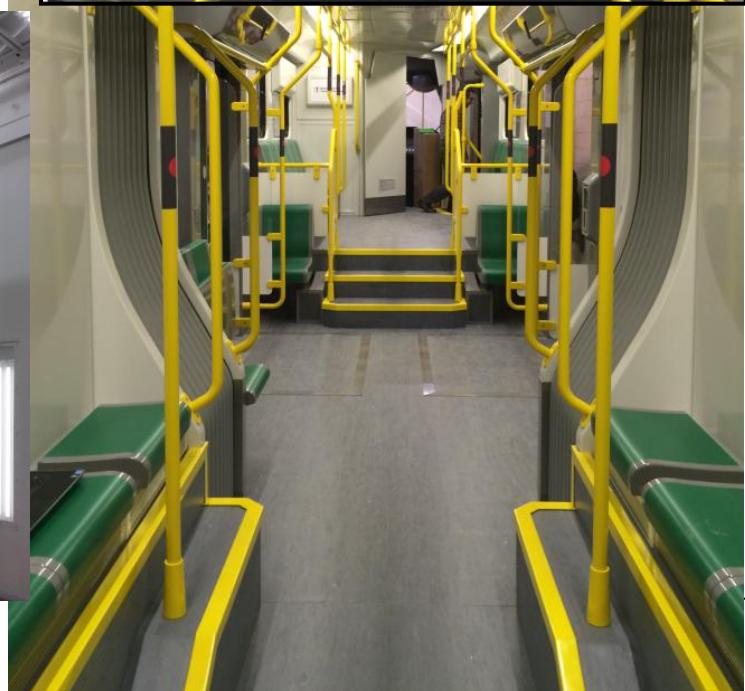
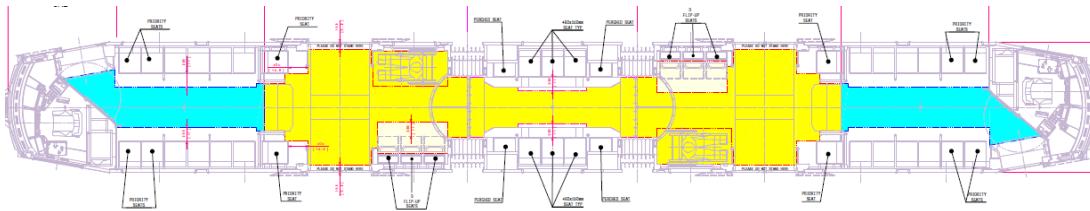
- Sliding Plug Doors Reduce Interference with Passengers on the Platform to Improve Boarding





Maximized Passenger Capacity, Boarding & Accessibility

- Type 9 Interior Design Allows for 10% increase in Passenger Capacity





Next Steps

- **Continue Design Optimization, System Level Engineering Testing and Inspection**
- **Finalize Contract Modification 2 and Prepare for Vehicle Level Testing**
 - Provisions for AFC 2.0 & GLTP, Installation of MBTA GL Tracking Equipment
 - Increased Braking Capacity, Wheel Thickness and Friction Modifiers
 - Design Schedule lengthened by 54 days and a \$720,000 Credit provided for Needed Capital Spares
 - Pilot Qualification Contractually Required to Begin Late October
- **Initiate Pilot Car Testing at the CAF Elmira, NY Facility in October 2017**
- **First Type 9 car in Passenger Service Spring of 2018**
- **All Cars in Passenger Service by Winter 2018**



Green Line Type 9 Project Update

Thank You



Appendix Project Budget Status

Vehicle Contract CAF USA Inc. 24 Green Line Light Rail Vehicles	\$118,159,822
Force Account, Project Administration, Legal & Professional Services	\$28,755,972
Project Contingency and Possible Future Effort	\$35,735,120
Total Contract Budget	<u>\$182,650,914</u>
 Total Spent through February 2017	 \$38,180,678
 Contract Modifications - 1 & 2 (Includes a Credit for Capital Spares)	 -\$720,000
 Committed Future Effort - Capital Spares	 \$4,188,312

